KANSAS wraps | Watershed Restoration and Protection Strategy

Kansas Watershed Restoration and Protection Strategy (KS WRAPS)

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Kansas Environmental Conference

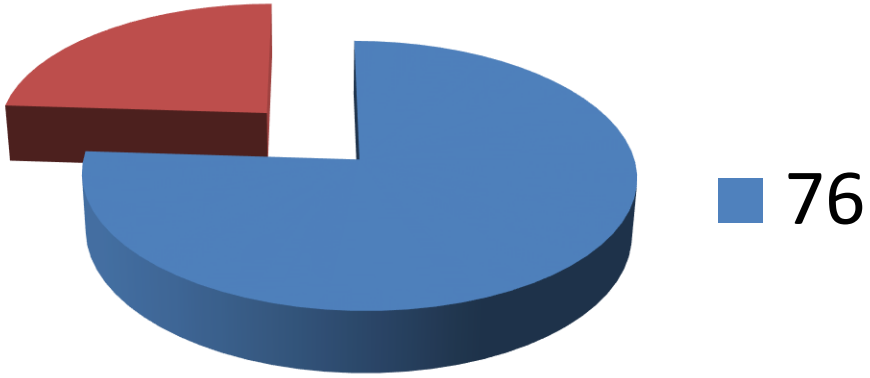
August 10, 2016

Kansas Department of Health and Environment

Our vision is 'healthy Kansans living in safe and sustainable environments'.
The state belongs to all of us - "Kansas Don't Spoil It"

- Nonpoint Source Pollution: any activity that is not required to have a national pollutant discharge elimination system permit and that results in the release of pollutants to waters of the state. This release may result from precipitation runoff, aerial drift and deposition from the air, or the release of subsurface briner or other contaminated groundwater's to surface waters of the state." – KAR 28-16-28b

- 76% of the impaired water bodies in the United States are contaminated from nonpoint sources of pollution. **It is the #1 water quality problem in the country.**



- Primary contaminants of concern in Kansas include sediment, nutrients, bacteria.

- Bureau of Water, Watershed Management Section NPS priorities:
  - 1. Restoration of high priority TMDL watersheds
  - 2. Protection of PWS watersheds and wellhead capture zones used for PWS
  - 3. Protection of high value water bodies designated for SALU, ESW, ONRW
  - 4. Restoration and protection of high priority wetlands and riparian areas
  - 5. Restoration and protection of watersheds with interstate significance
- Watershed Management Section Programs:
  - Local Environmental Protection Program (Domestic Graywater)
  - Local Water Quality Protection Plans
  - Information and Education CWA Section 401 Water Quality Certification
  - Drinking Water Protection
  - Kansas Water Pollution Control Revolving Fund for NPS
  - Proposed Local Conservation Lending Program
  - Green Infrastructure Program
  - CWA Section 319 NPS Program
  - **KS WRAPS Program**

Purpose is to protect and restore Kansas watersheds

- Restore / Protect quality of drinking water

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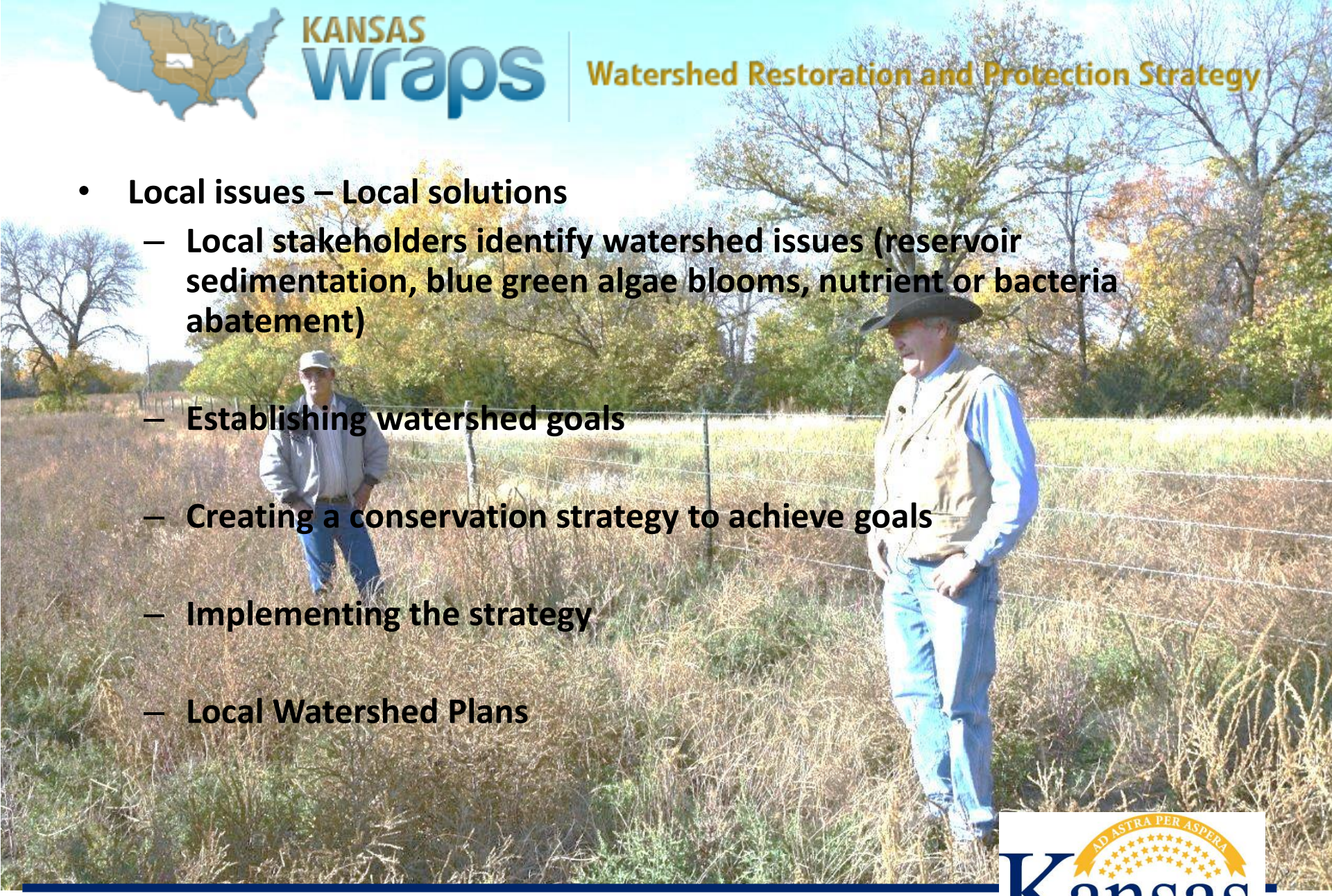
Purpose is to protect and restore Kansas watersheds

- Restore / Protect quality of drinking water
- Preserve the life of federal reservoirs

Purpose is to protect and restore Kansas watersheds

- Restore / Protect quality of drinking water
- Preserve the life of federal reservoirs
- Improve aquatic ecosystems



- **Local issues – Local solutions**
  - **Local stakeholders identify watershed issues (reservoir sedimentation, blue green algae blooms, nutrient or bacteria abatement)**
  - **Establishing watershed goals**
  - **Creating a conservation strategy to achieve goals**
  - **Implementing the strategy**
  - **Local Watershed Plans**

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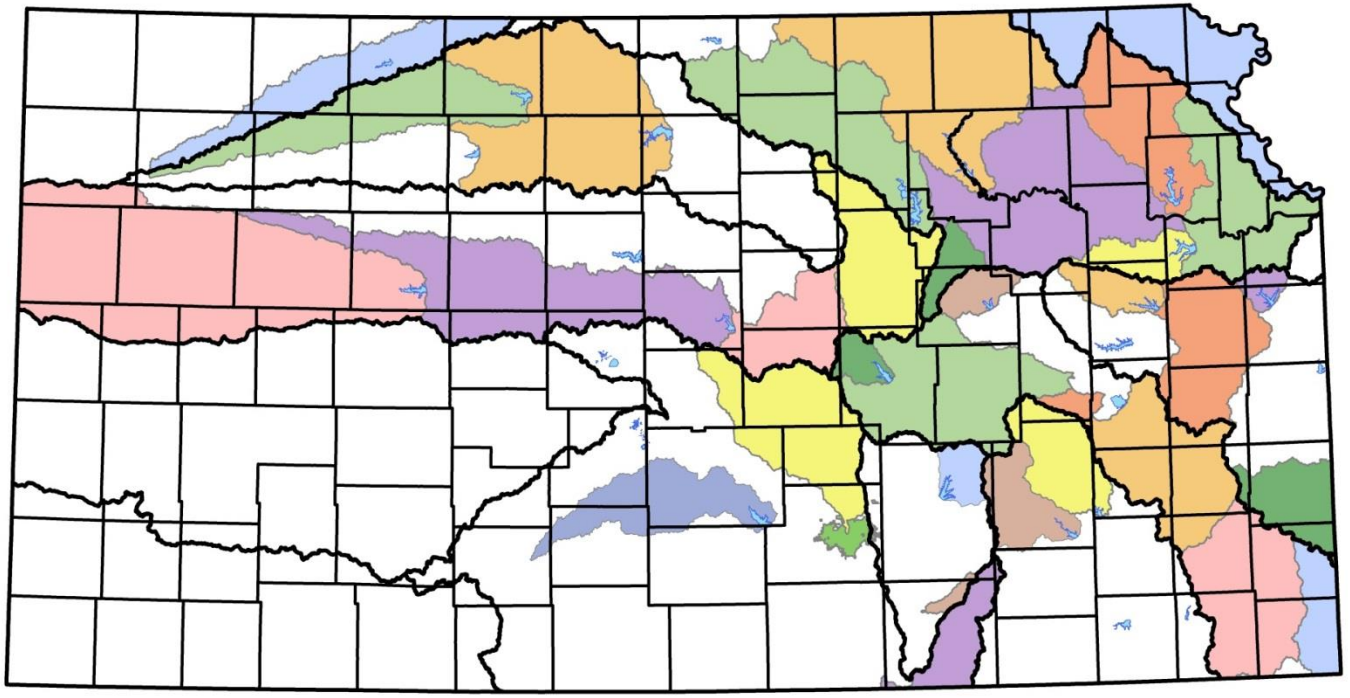
Kansas WRAPS Projects



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January 2015

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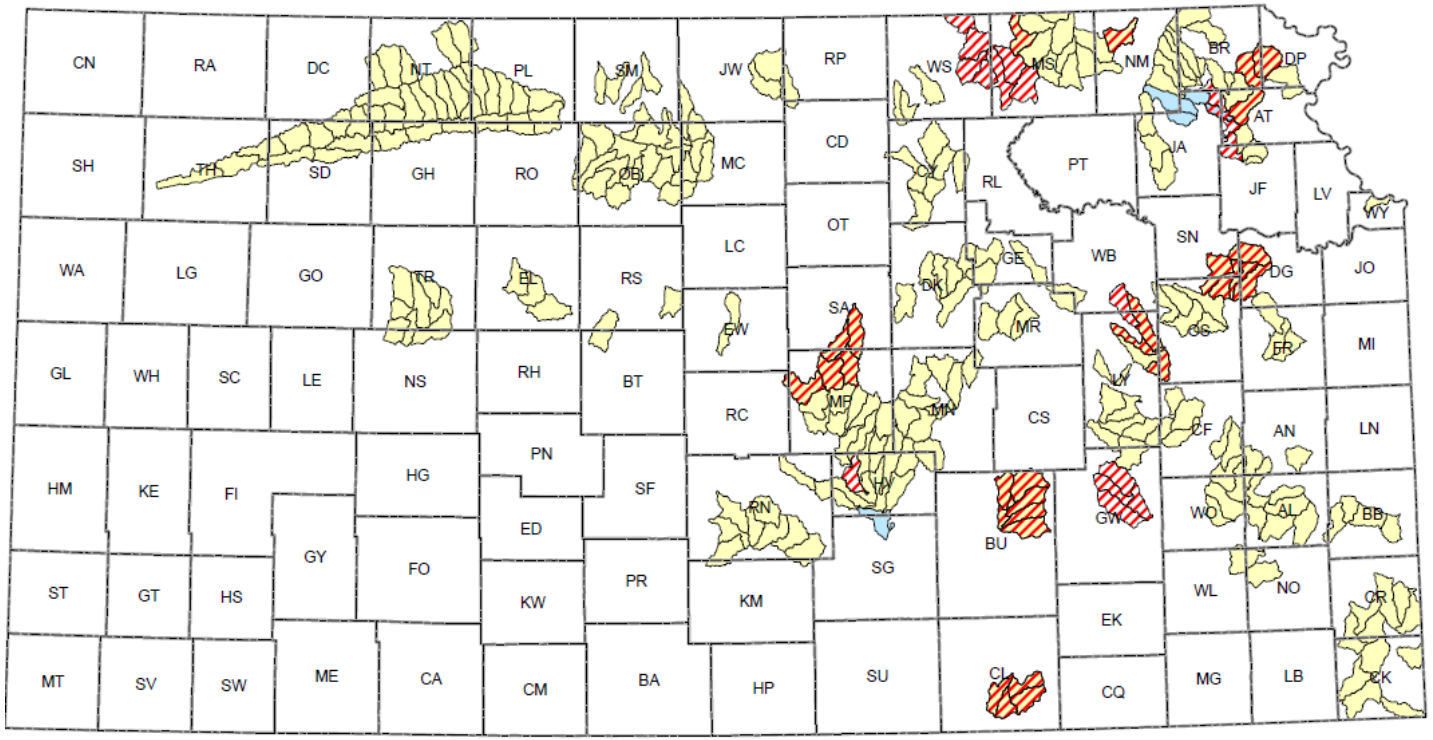
Nutrient/Sediment Targeted Areas

*From WRAPS Plans
as of September 2012



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- Streambank Targeted HUC 12
- Cropland Targeted HUC12
- Gully Targeted HUC 12

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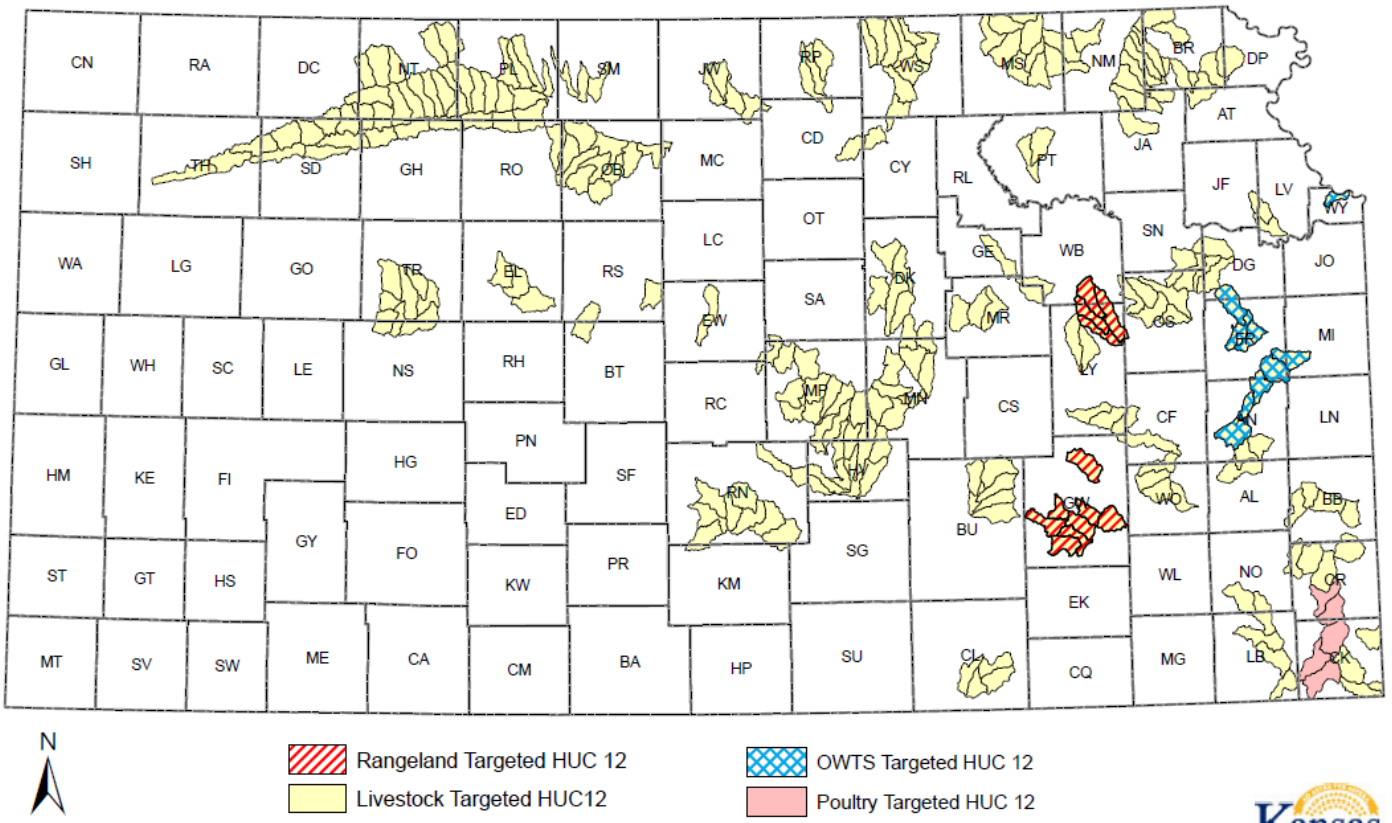
Livestock & Rangeland Targeted Areas

*From WRAPS Plans
as of September 2012



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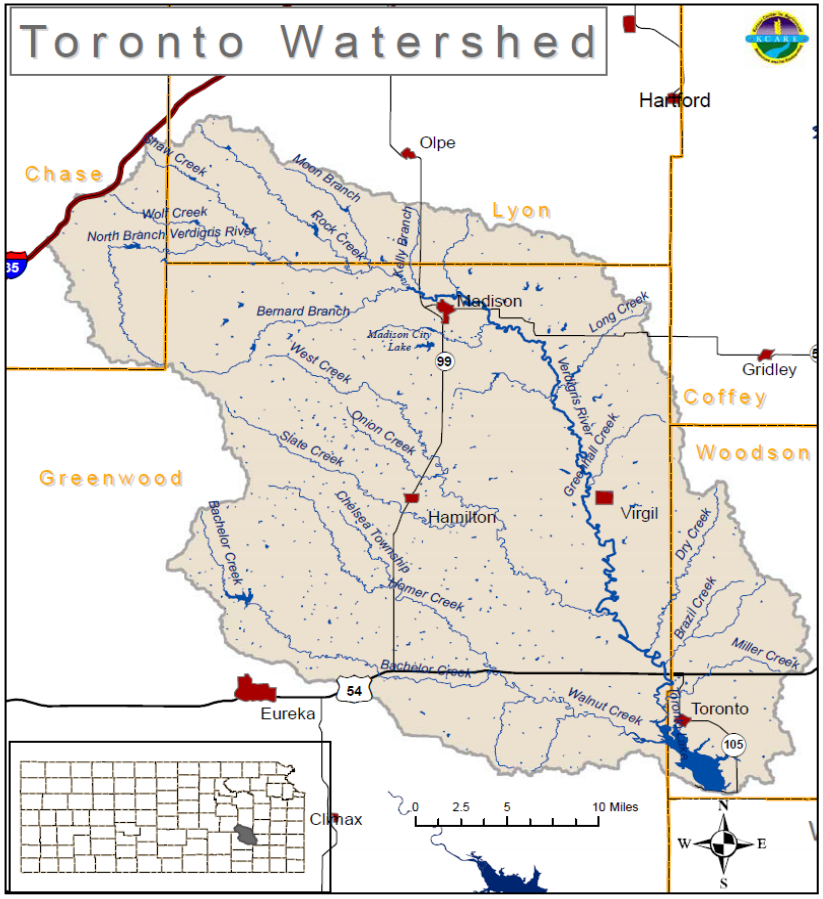
Watershed Restoration and Protection Strategy

WRAPS 9 Element Watershed Plans
Toronto Lake Watershed Example



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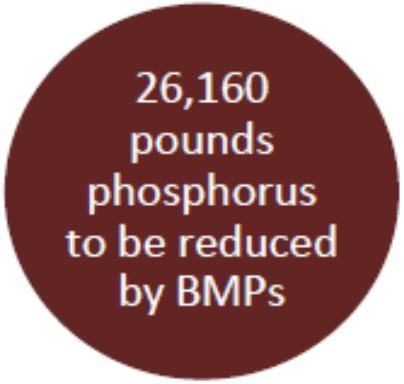
Restoration and Nonpoint Source Focus

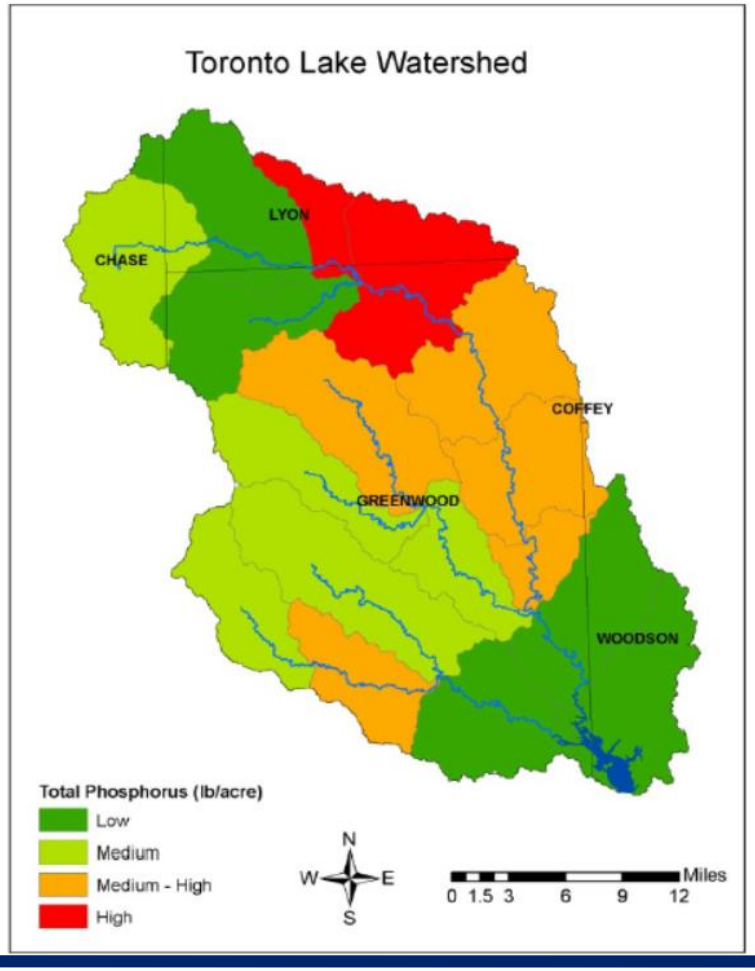
- Implementation of Total Maximum Daily Loads
- Impaired Waters - 303(d) List
- Toronto Lake – HP TMDL (Eutrophication & Siltation)
- TMDLs provide NPS load reduction goals:



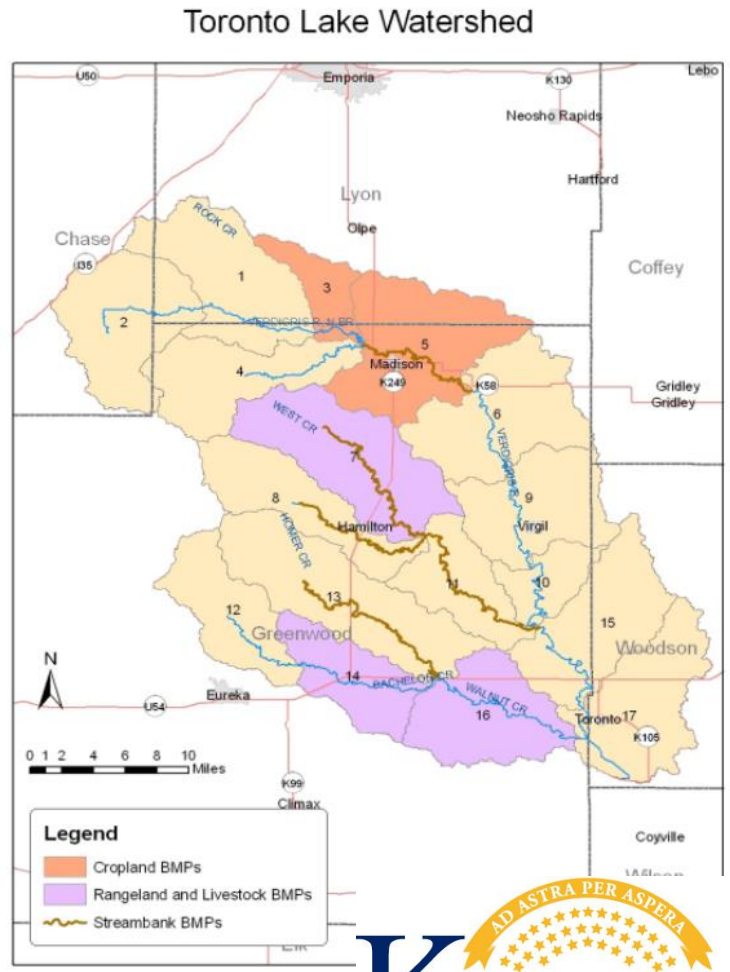
Assessing the Watershed for Critical Targeted Areas

- SWAT – KSU Dept. of Biological and Ag Engineering
  - Data for SWAT model collected from a variety of reliable online and printed data sources and knowledgeable agency personnel within the watershed.
    1. 30 meters DEM (USGS National Elevation Dataset)
    2. 30m NLCD 2001 Land Cover data layer (USDA-NRCS)
    3. STATSGO soil dataset (USDA-NRCS)
    4. NCDC NOAA daily weather data (NOAA National Climatic Data Center)
    5. Point sources (KDHE on county basis)
    6. Septic tanks (US Census)
    7. Crop rotations (local knowledge)
    8. Grazing management practices (local knowledge)
  - Top 20-30% of pollutant producing subwatersheds are selected as critical areas for cropland and livestock BMP implementation.

- Watershed assessments



- Determine critical areas



Best Management Practice Implementation

Combination of Livestock, Cropland, Streambank* and Rangeland BMPs to Meet the Toronto Phosphorous TMDL						
Year	Livestock Reduction (lbs/yr)	Cropland Reduction (lbs/yr)	Streambank* Reduction (lbs/yr)	Rangeland* Reduction (lbs/yr)	Total Reduction (lbs/yr)	% of TMDL
1	152	548	120	10	830	3.2%
2	1,096	1,095	240	20	2,451	9.4%
3	1,172	1,643	360	30	3,205	12.3%
4	2,115	2,190	480	40	4,826	18.4%
5	2,268	2,738	600	50	5,656	21.6%
6	3,211	3,286	720	60	7,276	27.8%
7	3,287	3,833	840	70	8,030	30.7%
8	4,230	4,381	960	80	9,651	36.9%
9	4,383	4,928	1,080	90	10,481	40.1%
10	5,250	5,476	1,200	100	12,026	46.0%
11	5,403	6,006	1,320	110	12,839	49.1%
12	6,346	6,537	1,440	120	14,443	55.2%
13	6,422	7,068	1,560	130	15,180	58.0%
14	7,365	7,598	1,680	140	16,784	64.2%
15	7,518	8,129	1,800	150	17,597	67.3%
16	8,385	8,659	1,920	160	19,124	73.1%
17	8,537	9,190	2,040	170	19,937	76.2%
18	9,481	9,721	2,160	180	21,541	82.3%
19	9,633	10,251	2,280	190	22,354	85.5%
20	10,500	10,782	2,400	200	23,882	91.3%
21	10,730	10,782	2,400	200	24,111	92.2%
22	11,597	10,782	2,400	200	24,978	95.5%
23	11,826	10,782	2,400	200	25,208	96.4%
24	12,693	10,782	2,400	200	26,075	99.7%
25	12,923	10,782	2,400	200	26,304	100.6%

*Assume average Phosphorous content in floodplain soil is 20 ppm.

Load Reduction Estimates

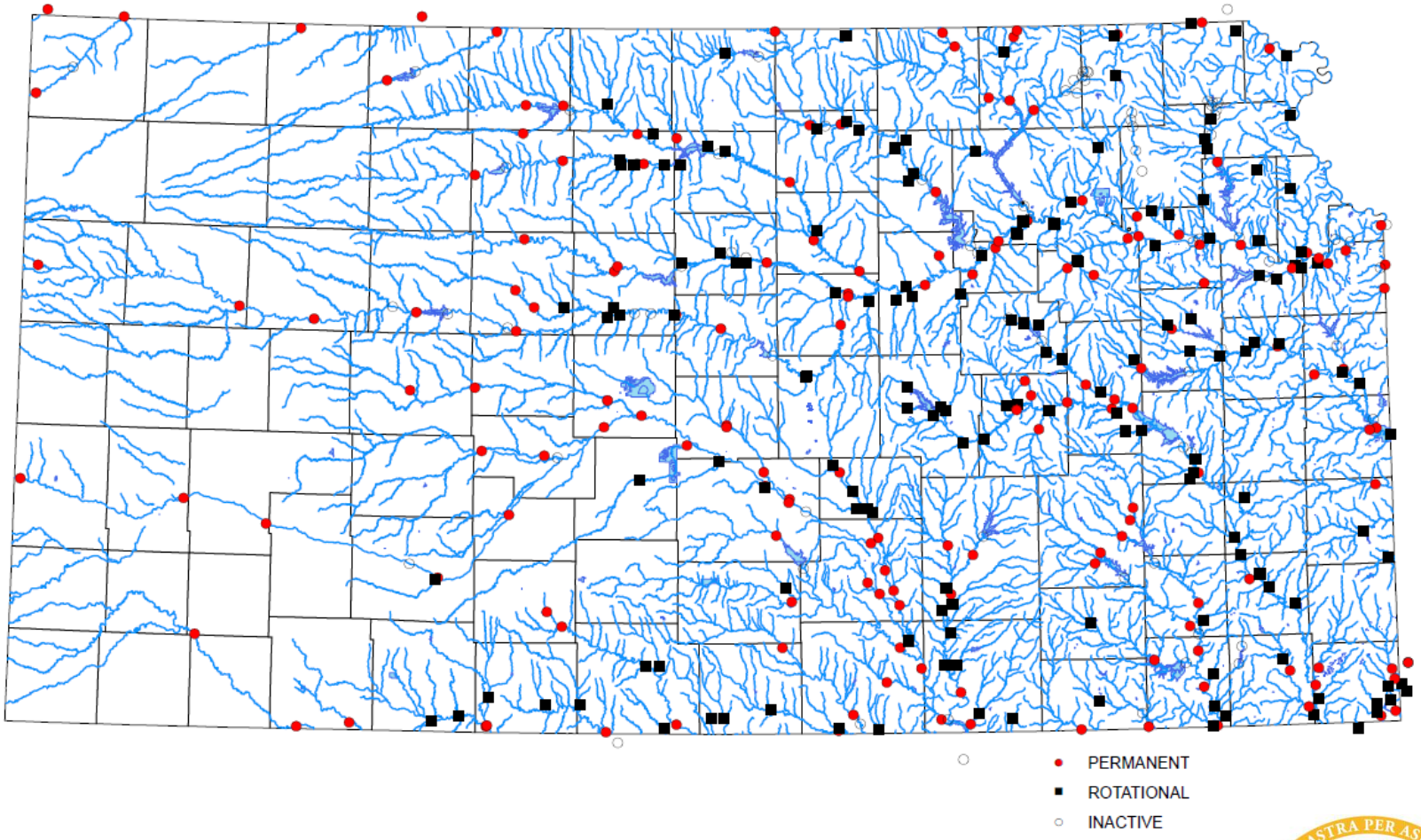
- Region 5 Load Reduction Model
  - Provides estimate of nutrient and sediment load reductions from the implementation of agricultural and urban BMPs at the source level.
  - Utilizes the Revised Universal Soil Loss Equation (RUSLE) to calculate the gross erosion rate before and after a BMP is implemented.
  - Factors used in the RUSLE include Rainfall-Runoff Erosivity Factor, Soil Erodibility Factor, Slope Length, Cover Management Factor and Support Practice Factor and currently use county level data to make calculations.
  - Livestock practice load reductions are calculated with a methodology developed in “Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual” (Michigan DEQ, June 1999), and includes local precipitation data.

Focus on Implementation

- With the priority areas identified, BMPs selected – projects have been focusing on implementation.
  - FFY 15 National Results:

  Kansas Ranks:
    - Sediment Reduction - #2 in the country at 100,805 tons / yr
    - Phosphorus - #5 in the country at 192,660 lbs / yr
    - Nitrogen - #8 in the country at 381,972 lbs/ yr
  - Emphasis on partnership:
    - NRCS, DOC, WRAPS

KANSAS STREAM CHEMISTRY MONITORING SITES



Focus on Results - Baseline

- Supplemental Monitoring Strategy Initiated in late 2010
- Identified 15 subwatersheds (WRAPS targeted areas)
- 1 paired watershed study
- 4 routine samples during March – October timeframe
- One additional synoptic sample during a major runoff event
- Parameters: TSS, nutrients (N&P), pH, DO, temperature, Bacteria and flow estimates (Atrazine specific to subwatershed)
- The paired watershed study will include water chemistry, biological, flow and habitat sampling

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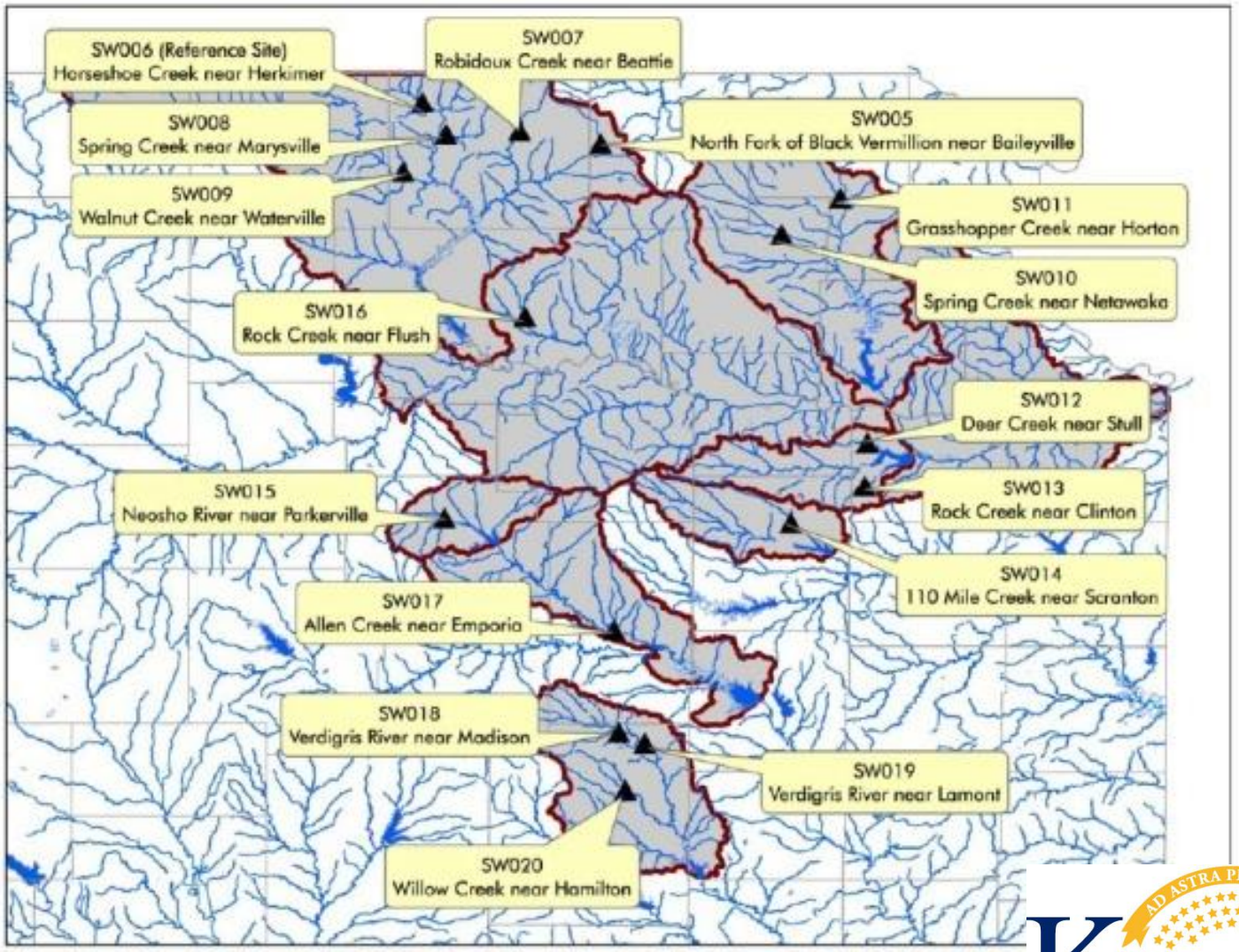

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Watershed Success Story

- Load Reductions lead to Success (improved water quality to meet water quality standards)
- Success Stories
  - Clarks Creek – (136 stream miles) Bacteria
  - Allen Creek (31 stream miles)– Bacteria
  - Banner Creek Reservoir – Phosphorus and Chlorophyll
  - Walnut and West Creeks (30 miles) – Dissolved Oxygen
  - Eagle Creek (~72 miles) – Dissolved Oxygen
  - Dragoon Creek (76 miles)– Dissolved Oxygen
  - Neosho River (32 miles) – Bacteria
  - Big Creek (~63 miles) – Bacteria
  - Mill Creek (74 miles) – Bacteria
  - Fall River (144 miles)

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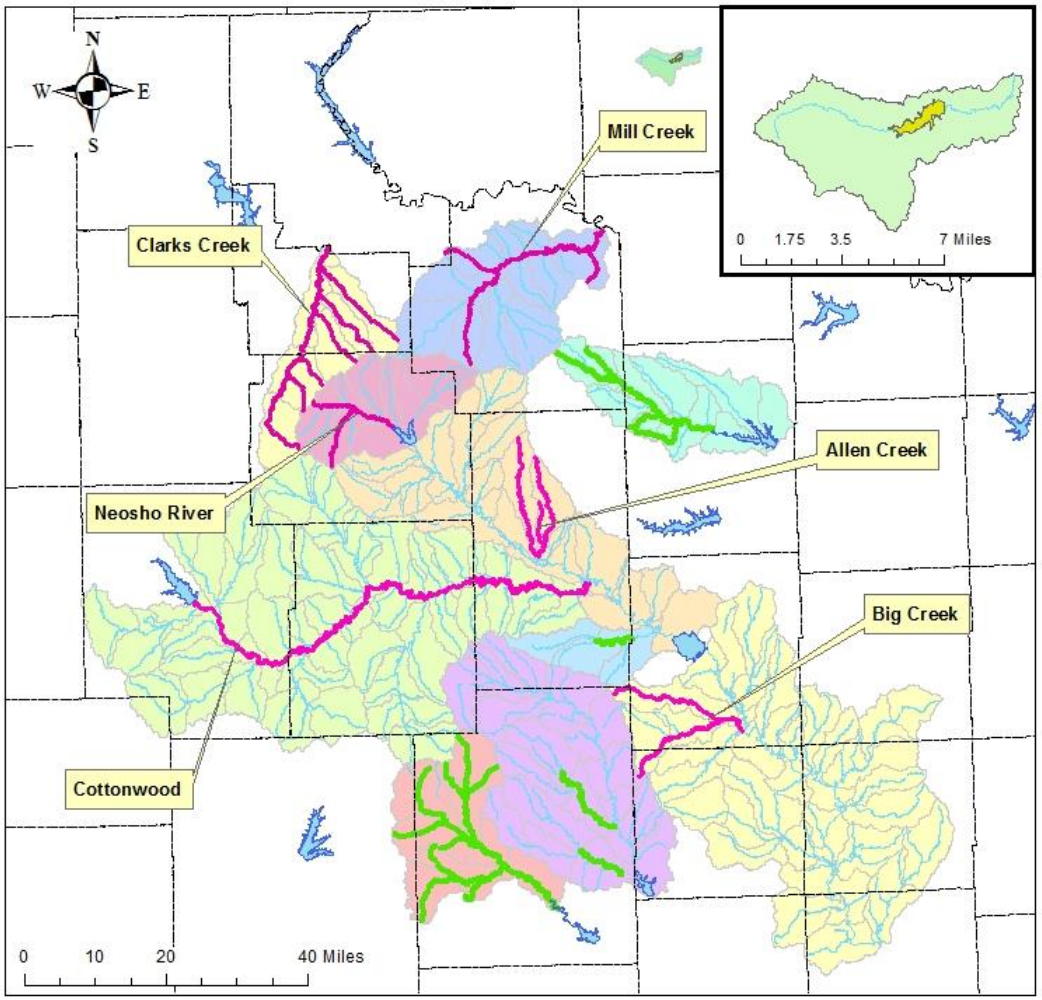
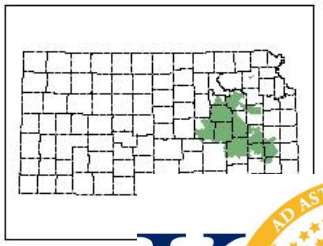
WRAPS Project Areas with Success Stories





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Watershed Success Story

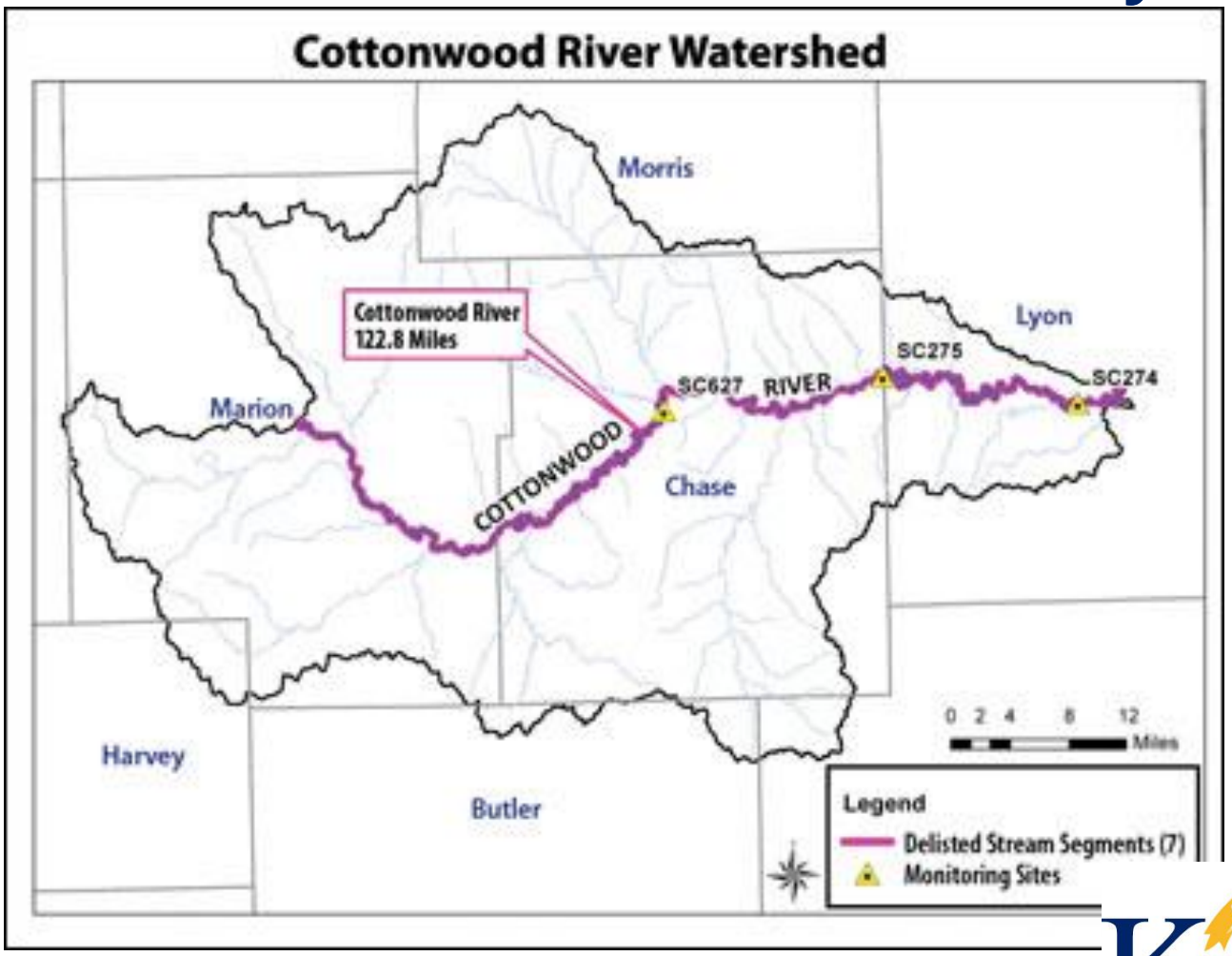
Cottonwood River Delisted from Impaired Waters List for Bacteria

- **303(d) list of impaired waters in 1998 for bacteria**

- **Removed 123 stream miles in 2012 as a result of Best Management Practices**

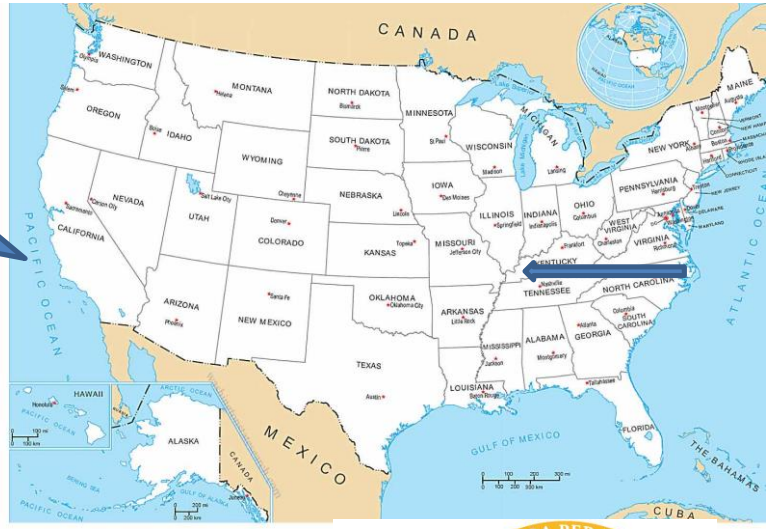
- **Made possible by cooperative watershed management with state, local, federal governments, local organizations, local landowners to mitigate nonpoint source pollution.**

Watershed Success Story



Watershed Success Story

781 Stream Miles!



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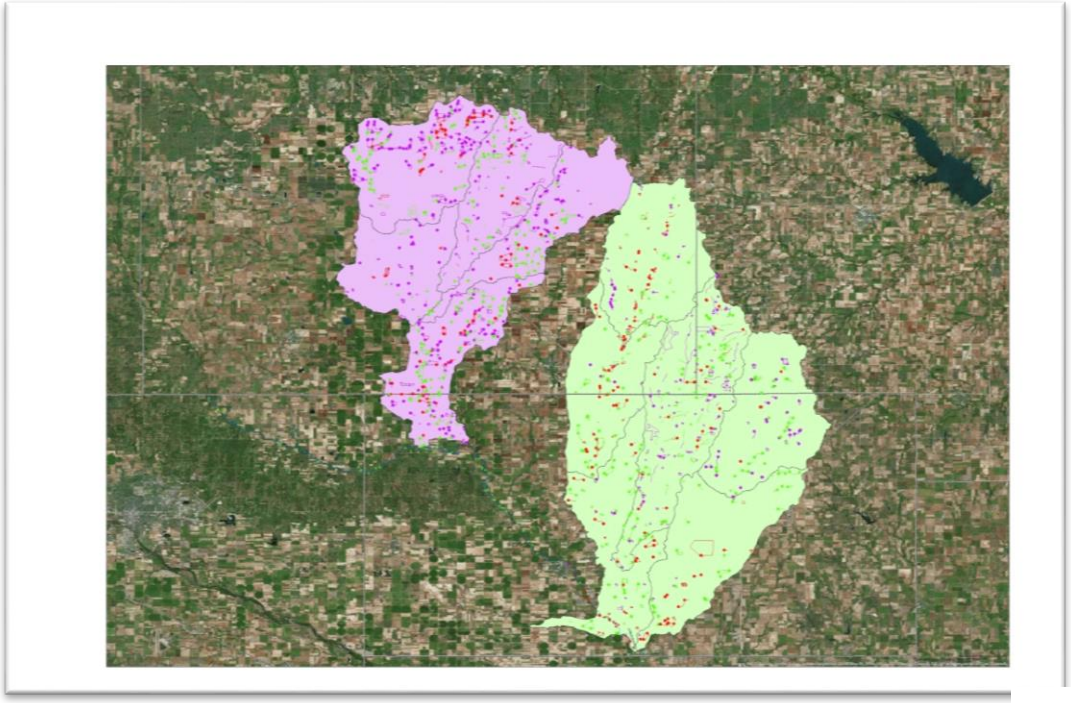
KS WRAPS Program: Where we are headed

- Continued Focus / Emphasis on conservation practice Implementation
- Providing more resources than ever towards implementation
- Watershed Plan Review – 5 year
  - Evaluation of how we are doing
  - Stay the course? Change directions?

9 Element WRAPS Plan Review

- 4 Components
  - Stakeholder Leadership Team self evaluation
  - Pre-evaluation Reconnaissance
  - Evaluation
  - Update of 9 Element Watershed Plan

WRAPS Critical Area Aerial Assessments…

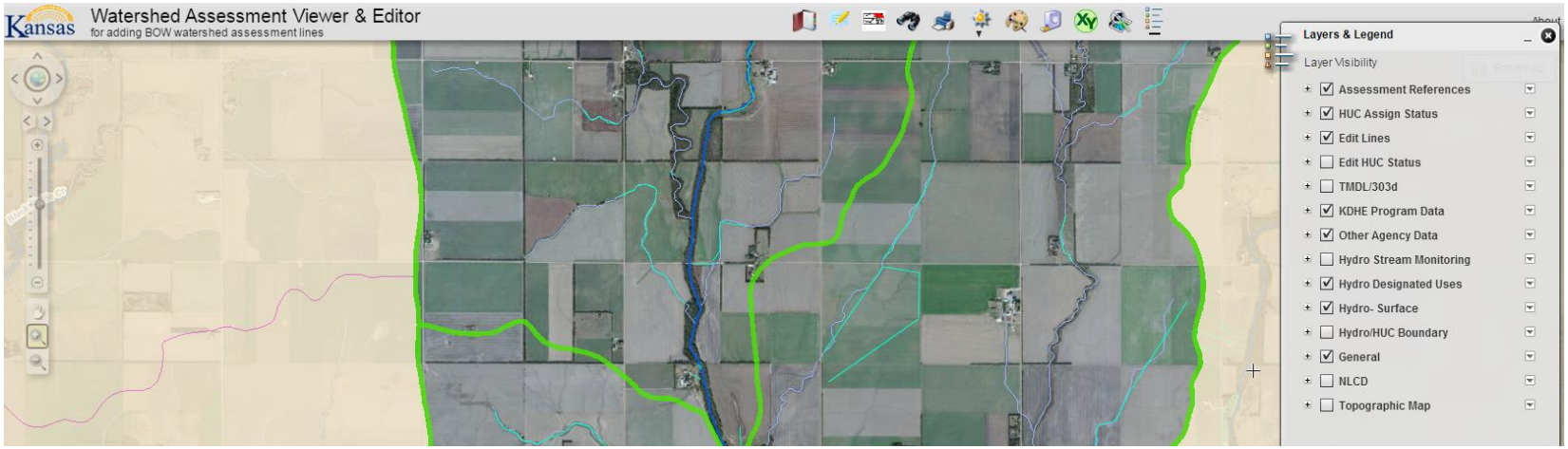


...with Plan Review

- Nine Element Watershed Plan Review – 2015
  - Targeted Areas
  - Targeted Practices
  - Change targeted areas?
- WRAPS finding projects vs. projects finding WRAPS
  - What practices to focus on

Aerial Assessments

- Looking at Aerial Images to identify NPS areas of interest
- WMS GIS Webmapper tool and protocol developed to look at aerial images and mark them

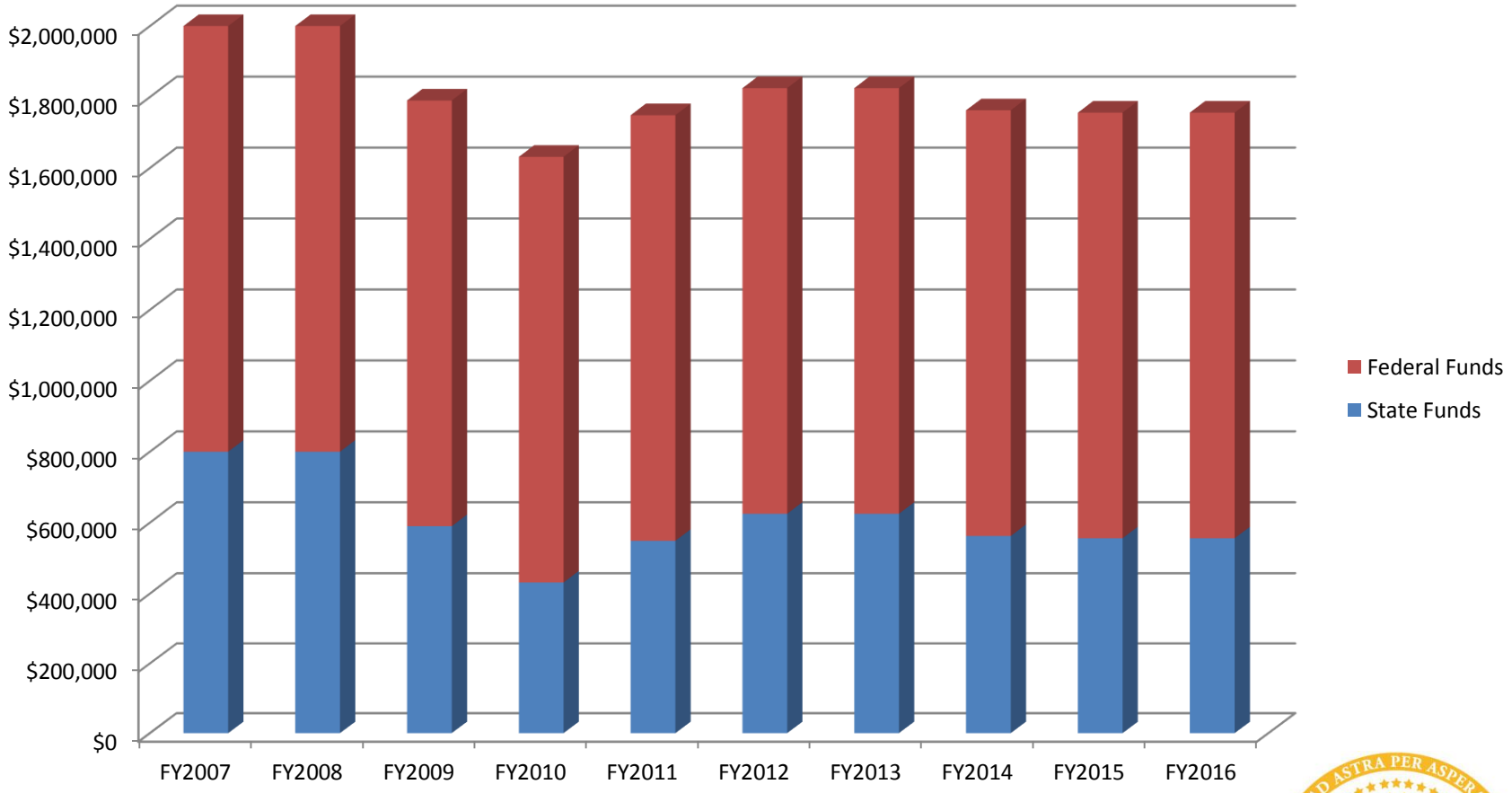


- No geospatial analysis is being done or data collected, only using professional judgment to identify areas for further investigation

WRAPS Program Challenges

- Budget
- Voluntary Program

KS WRAPS Budget:



- **KS WRAPS Program Budget Categories**

Budget Category	Description	Avg. Proposed Allocation	Avg. Percentage of each Years' Total Allocation
Technical Assistance	Ks Forest Service, Watershed Specialists, WRAPS projects directly contracting with other service providers for TA.	$427,725 each year	17%
Personnel	Salaries, Fringe, Travel, Supplies and Other	$864,802 each year	34%
BMP	Demonstration projects or Best Management Practices	$1,065,833 each year	41%
Administration	Includes indirect, overhead and grant oversight	$149,572 each year	6%
Information & Education	Includes workshops, fliers, etc.	$24,480 each year	1%
Monitoring	Water Quality Monitoring Equipment or Lab costs (not including personnel associated with monitoring)	$34,572 each year	1%
TOTAL		$2,566,984	100%

Annual Funding Needs for Conservation Practices

WRAPS Plan Best Management Practice Funding Needs to achieve TMDLs and/or protect high priority waters.						
WRAPS	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Middle Marais des Cygnes	$70,454	$73,090	$71,876	$77,540	$76,255	$369,215
Middle Neosho	$732,080	$756,616	$779,846	$803,786	$822,836	$3,895,164
Milford	$371,701	$391,002	$397,849	$411,197	$418,352	$1,990,101
Missouri	$32,716	$56,732	$28,581	$77,177	$57,007	$252,213
Neosho Headwaters	$180,259	$189,272	$191,236	$200,797	$202,883	$964,447
Pomona	$190,905	$198,902	$202,531	$211,016	$214,867	$1,018,221
Prairie Dog Creek	$444,025	$507,029	$445,576	$562,818	$638,639	$2,598,087
Spring River	$188,450	$200,188	$199,927	$212,379	$212,103	$1,013,047
Toronto	$73,796	$81,074	$71,924	$86,011	$83,058	$395,863
Tuttle	$1,415,486	$1,470,949	$1,501,690	$1,560,531	$1,593,144	$7,541,800
Twin Lakes	$105,823	$109,388	$112,268	$116,050	$119,105	$562,634
Upper Lower Smoky	$198,780	$203,240	$216,872	$215,618	$223,327	$1,057,837
Upper Neosho	$708,583	$729,020	$755,247	$773,417	$797,515	$3,763,782
Upper Timber	$11,726	$12,078	$12,441	$12,814	$13,199	$62,258
Upper Wakarusa	$56,073	$56,073	$56,073	$112,146	$112,146	$392,511
Upper Walnut	$152,864	$154,200	$158,827	$165,231	$170,362	$801,484
Waconda	$1,077,060	$1,113,281	$1,146,679	$1,181,079	$1,452,323	$5,970,422
Total	**$11,118,783**	**$11,450,639**	**$11,277,801**	**$11,821,662**	**$12,446,160**	**$58,115,045**

Our combined budget needs to achieve Water Quality Goals in watershed plans:

WRAPS goals only – there are other water bodies of priority that are not included in this estimate! (WRAPS = 45% of state)

KS WRAPS Program: Where we are headed

- Funding Diversity
  - NRCS – National Water Quality Initiative
  - Division of Conservation Partners
- Partner/Pursue new funding sources
  - Nutrient CREP – KWO
  - Local Conservation Lending Program - KDHE
  - Off-site BMP Implementation – Little Ark WRAPS
  - Drinking Water Protection – KDHE
  - Governor's Water Vision - BRTF

Water Conservation Costs

Water Conservation	Action	Cost
Research		
Education and Outreach	Strategic Education Plan	$ 4,250,000
Actions and Practices		
	Implementation of Best Management Practices	$ 15,500,000
	Streambank Stabilization	$ 5,000,000
	Construction of Watershed Dams	$ 1,000,000
	CREP Implementation	$ 400,000
Administration		
Total		**$ 26,150,000**

KS WRAPS Program: Where we are headed

- Outreach Campaign
  - Tell the story of our program
  - Professional Development
  - Two primary audiences
    - Policy makers / Legislators
    - Landowners / Producers

Questions

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